

1970

OPERATING SUMMARY

LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION

LIBRARY COPY

JAN 21 1972

ONTARIO WATER
RESOURCES COMMISSION

DUNNVILLE

(REGIONAL)

water

treatment

plant

TD
227
D86
D86
1970

c.1
a aa

ONTARIO WATER RESOURCES COMMISSION

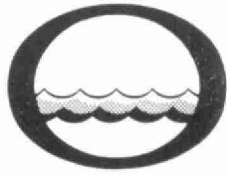
Division of Plant Operations

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water treatment plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

D.S. Caverly,
General Manager.

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

Title page.	1
Flow diagram	2
Design data	3
'69 Review	4
Project costs	6
Process data	11



Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN
D. J. Collins

VICE-CHAIRMAN
J. H. H. Root, M. P. P.

COMMISSIONERS
H. E. Brown
F. S. Hollingsworth
Dr. C. A. Martin
D. A. Moodie
L. E. Venchiarutti

GENERAL MANAGER
D. S. Caverly

ASSISTANT GENERAL MANAGERS
K. H. Sharpe
F. A. Voegel
A. K. Watt

COMMISSION SECRETARY
W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

Director
D. A. McTavish

Assistant Director
C. W. Perry

Regional Supervisor
P. J. Osmond

Operations Engineer
J. Wesno

135 St. Clair Avenue West
Toronto 195

**DUNNVILLE REGIONAL
water treatment plant**

operated for

THE TOWN OF DUNNVILLE

THE ELECTRIC REDUCTION COMPANY LIMITED

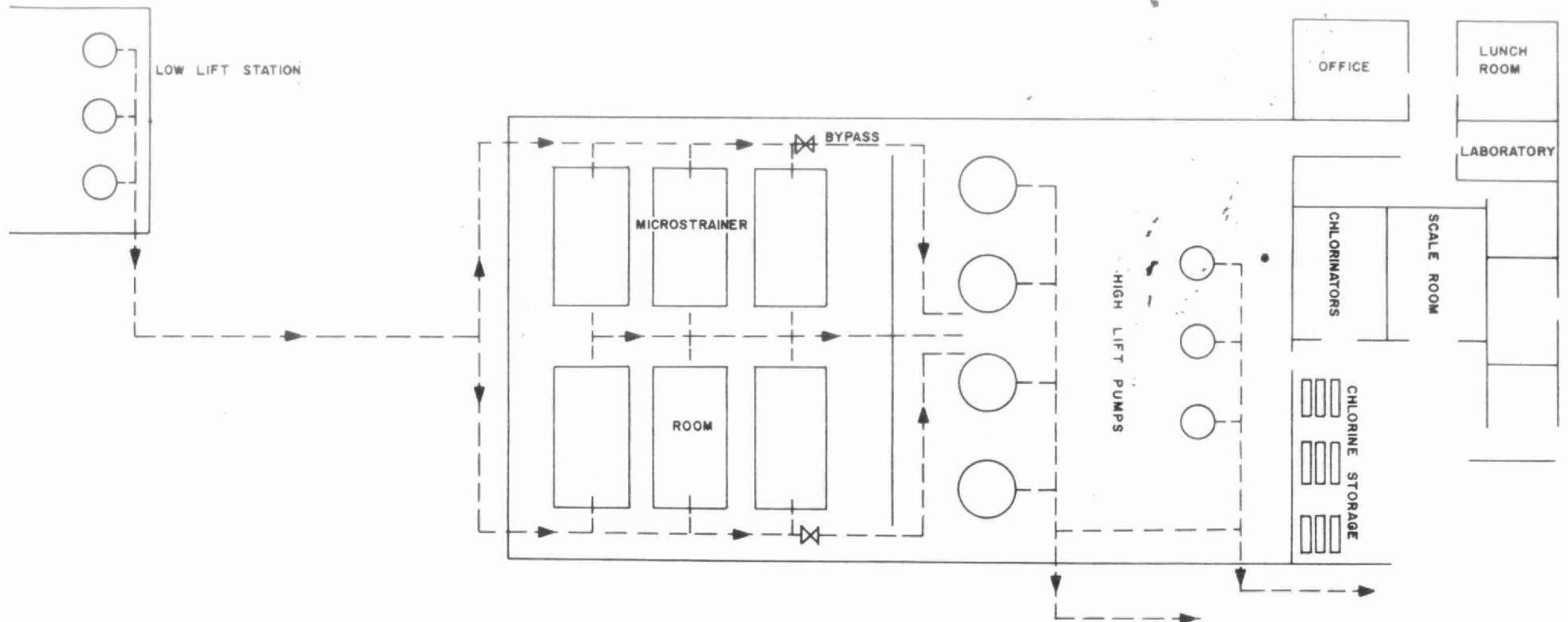
SHERBROOKE METALLURGICAL COMPANY LIMITED

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY

DUNNVILLE REGIONAL WATER TREATMENT PLANT



DESIGN DATA

PROJECT NO. 6-0017-58

NOMINAL CAPACITY 20.5 mgd

RAW WATER SOURCE: Lake Erie

INTAKE

Depth of Intake - 25 ft.

Intake Pipe

Size: 1600 ft of 48" dia asbestos bonded corrugated metal

LOW LIFT PUMPING STATION

Screens

Four removable screens 5' 6" sq with 3/8" openings

Low Lift Pumps

Type: Byron Jackson vertical turbine
Size: Three 5700 gpm @ 38 ft TDH

MICROSTRAINER

Type: Glenfield & Kennedy with MK 1
fabrice (opening size 35 microns)
Size: Six 10' x 10'

CLEARWELL

Size: Two compartments, total capacity 200,000 gal.

CHLORINATION

Chlorinator

Type: W & T A-711
Size: Two 2000 lb per day
Chlorine added at entrance to clear well

HIGH LIFT PUMPS

Supply to Dunnville (via 23,000 ft of 16" dia asbestos cement pipe)

Type: Wheeler Economy single stage
Size: One 1000 gpm @ 135' TDH
One 1200 gpm @ 135' TDH

Supply to Port Maitland (via 20,000 ft of 30" dia asbestos cement pipe)

Type: Worthington single stage
Size: Four 4000 gpm @ 200' TDH

'70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	9.83	—	297.4	—
High	12.37	August	383.8	August
Low	8.33	January	241.0	February

GENERAL

Tenders were called for the installation of the travelling water screen in September and it is anticipated that the work will be completed and ready for operation by March, 1971.

Two plant microstrainers were overhauled during the year as part of a comprehensive maintenance program. The remaining four microstrainers will be overhauled over the next two to three years.

A great influx of algae was experienced in the wet wells on two occasions during the year. This necessitated continual maintenance of the influent screens for periods up to sixteen hours on each occasion.

A build-up of frazile ice around the intake ports of the crib occurred in January, 1971 and resulted in a cut back of flows to the participants for approximately 24 hours. A tentative date for a L.A.C. meeting was set for the spring of 1971 to discuss methods of frazile ice control.

PLANT FLOWS

A total flow of 3568.8 million gallons was treated during the year representing an increase of 6.4% over the previous year. The total flow to the Town of Dunnville was 375.48 million gallons; to Electric Reduction Co. 1,181.41 million gallons; and to Sherbrooke Metallurgical Co. 2,011.95 million gallons representing respectively a 3.0% decrease, a 15% increase and a 3.6% increase over 1969.

The average daily flow was 9.83 mg. The maximum daily flow and maximum rate were respectively 14.4 mg and 14.8 mgd. The maximum daily flow of 14.4 mg occurred in the month of November.

WATER QUALITY

A total of 49 samples of raw water and 51 samples of treated water were analysed for the presence of coliforms. The average coliform count in the raw water was 31 per 100 millilitres and was zero for the treated water.

ALGAE ENUMERATION

Tests for total algae count carried out monthly on raw water samples indicated that maximum concentrations were prevalent during the spring and fall turn-over periods (April and October respectively). Both maxima were considerably less than those of the previous year, i.e., 900 as opposed to 1,300 and 1,300 as opposed to 2,900 A.S.U./ml.

TURBIDITY

The average turbidity for raw and treated water was approximately 9.8 Jackson Turbidity Units. At no time did the treated water turbidity meet the OWRC standard of 1.0 JTU.

Turbidities were relatively constant during the first ten months of the year, i.e., below 10 JTU and increased from 9 to approximately 33 during the last two months.

CHLORINATION and DISINFECTION

A total of 35,800 pounds of chlorine were used during the year at an average dosage rate of 1.0 mg/l to maintain a 15 minute residual of 0.5 mg/l in the treated water.

CONCLUSIONS

The Dunnville Regional Supply System was operated satisfactorily during the year. Two plant microstrainers were overhauled and the installation of a travelling water screen was partially completed at year-end. Peak algae concentrations in the raw water occurred in April and October and were considerably less than the peak concentrations of the previous year.

PROJECT COSTS

Long Term Debt to OWRC - (Revised Estimated)

Dunnville	\$ 546,880.86	
Electric	1,109,956.28	
Sherbrooke	911,769.49	
	<hr/>	<u>\$2,568,606.63</u>

Debt Retirement Balance at Credit
(Sinking Fund) December 31, 1970

Dunnville	\$ 146,501.16	
Electric	299,703.77	
Sherbrooke	246,667.02	
	<hr/>	\$ <u>622,871.95</u>

The total cost to the participants during 1970 was as follows:

Net Operating

Dunnville	\$ 22,891.87	
Electric	54,930.64	
Sherbrooke	<u>45,119.83</u>	\$ 122,942.34

Debt Retirement

Dunnville	\$ 11,036.05	
Electric	22,398.92	
Sherbrooke	<u>18,399.51</u>	\$ 51,834.48

Reserve

Dunnville	\$ 2,410.83	
Electric	4,710.44	
Sherbrooke	<u>3,898.21</u>	\$ 11,019.48

Interest Charged

Dunnville	\$ 30,634.42	
Electric	62,175.35	
Sherbrooke	<u>51,081.35</u>	\$ 143,891.12

TOTAL

\$ 329,687.42

RESERVE ACCOUNT

Balance at January 1, 1970

Dunnville	\$ 23,380.31	
Electric	54,516.71	
Sherbrooke	<u>44,257.81</u>	\$122,154.83

Deposited by Participant

Dunnville	\$ 2,410.83	
Electric	4,710.44	
Sherbrooke	<u>3,898.21</u>	\$ 11,019.48

Interest Earned

Dunnville	\$ 1,541.25	
Electric	3,680.27	
Sherbrooke	<u>3,005.28</u>	\$ 8,226.80

TOTAL

\$141,401.11

Less Expenditures

Dunnville	\$ 4,427.55	
Electric	10,636.60	
Sherbrooke	<u>8,752.68</u>	\$ 23,816.83

Balance at December 31, 1970

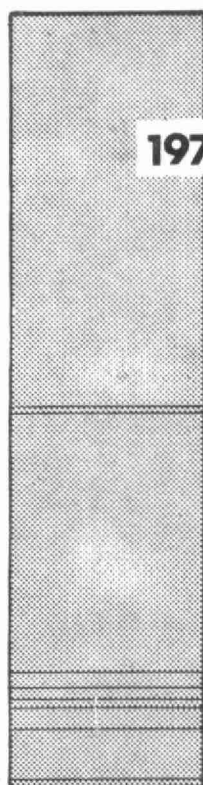
Dunnville	\$ 22,904.84	
Electric	52,270.82	
Sherbrooke	<u>42,408.62</u>	<u>\$117,584.28</u>

Yearly Operating Costs

Year	Mil. Gal. Treated	Operating Cost	Operating Cost per 1,000 gallons	Total Cost	Total Cost per 1,000 gallons
1966	3802.109	\$ 98,983.63	2.60¢	\$308,574.01	8.12¢
1967	3714.052	105,380.00	2.84¢	314,660.32	8.47¢
1968	3422.067	104,861.63	3.06¢	312,713.65	9.14¢
1969	3353.020	114,767.34	3.42¢	321,797.81	9.60¢
1970	3568.800	122,942.34	3.44¢	329,687.42	9.24¢

COST TO EACH PARTICIPANT IN 1970

Participant	Mil. Gal. Used	Operating Cost	Operating Cost per 1,000 gallons	Total Cost	Total Cost per 1,000 gallons
Town of Dunnville	375.48	22,891.87	6.10¢	66,973.17	17.84¢
Electric Reduction	1181.41	54,930.64	4.65¢	144,215.35	12.21¢
Sherbrooke Metallurgical	2011.95	45,119.83	2.24¢	118,498.80	5.88¢

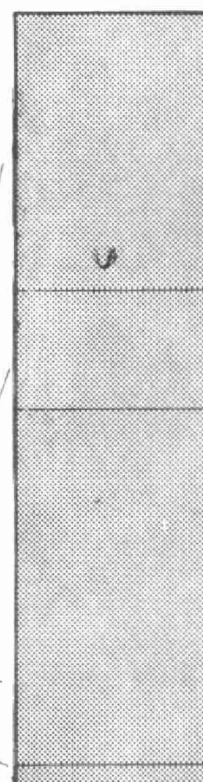


1970 OPERATING COSTS

• PAYROLL	51 %
• FUEL	1 %
• POWER	33 %
• CHEMICALS	3 %
• GENERAL SUPPLIES	2 %
• EQUIPMENT	1 %
• REPAIRS & MAINTENANCE	3 %
• SUNDRY	5 %
• TRAVEL	1 %

TOTAL ANNUAL COST

NET OPERATING	37 %	•
DEBT RETIREMENT	16 %	•
INTEREST	44 %	•
RESERVE FUND	3 %	•

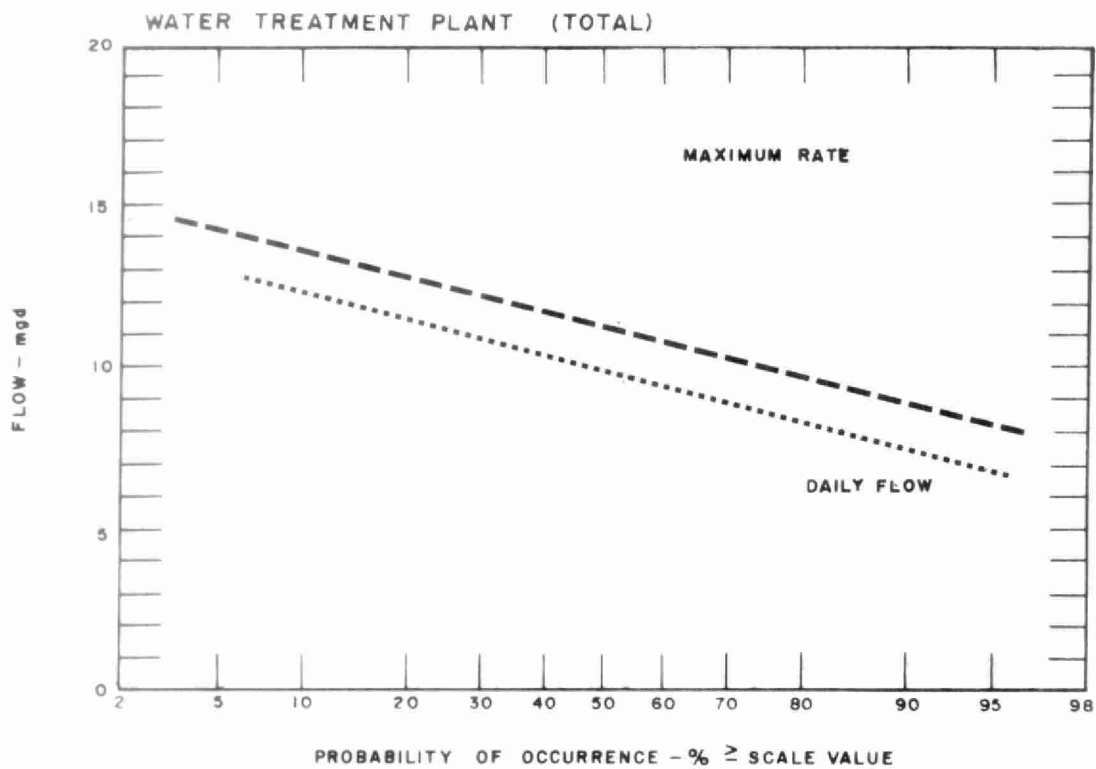


MONTHLY OPERATING COSTS

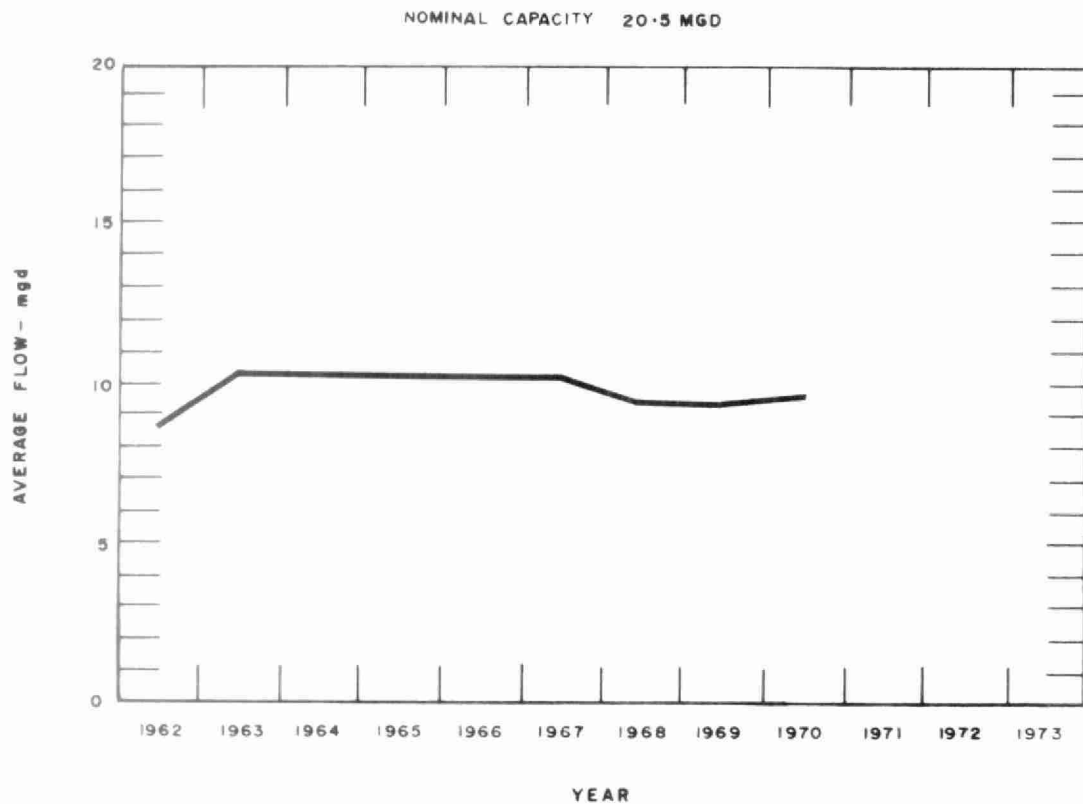
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	6616.11	6010.45	-	212.37	-	-	115.60	-	62.63	107.11	107.95	-
FEB	11354.36	4539.38	-	213.26	5866.97	-	297.65	359.21	92.89	-	-	(15.00)
MAR	8168.78	4371.14	-	161.58	2777.12	306.00	204.74	-	129.44	218.76	-	-
APR	8052.77	4275.64	-	167.46	2995.91	-	115.54	6.50	218.80	170.12	102.80	-
MAY	9608.46	5319.23	-	94.56	3207.11	-	205.94	-	453.06	76.36	267.20	(15.00)
JUNE	8656.16	4778.60	-	31.18	-	-	88.97	-	502.88	3332.10	(77.57)	-
JULY	14316.36	4529.45	-	24.39	6718.04	1261.25	161.08	991.62	573.29	73.22	-	(15.98)
AUG	11558.56	6900.31	-	3.23	3542.72	-	436.51	7.00	546.04	122.75	-	-
SEPT	10794.53	4663.87	-	-	3492.34	-	375.38	-	244.26	1944.88	73.80	-
OCT	9208.58	4612.45	-	20.96	3129.12	321.00	209.57	-	834.89	80.59	-	-
NOV	7020.36	5135.30	-	-	-	1190.00	425.00	76.44	157.09	72.88	-	(36.35)
DEC	13111.42	4835.88	-	61.32	7119.32	118.75	276.50	61.78	313.38	191.29	133.20	-
TOTAL	118466.45	59971.70	-	990.31	38848.65	3197.00	2912.48	1502.55	4128.65	6390.06	607.38	(82.33)

BRACKETS INDICATE CREDIT

PROCESS DATA

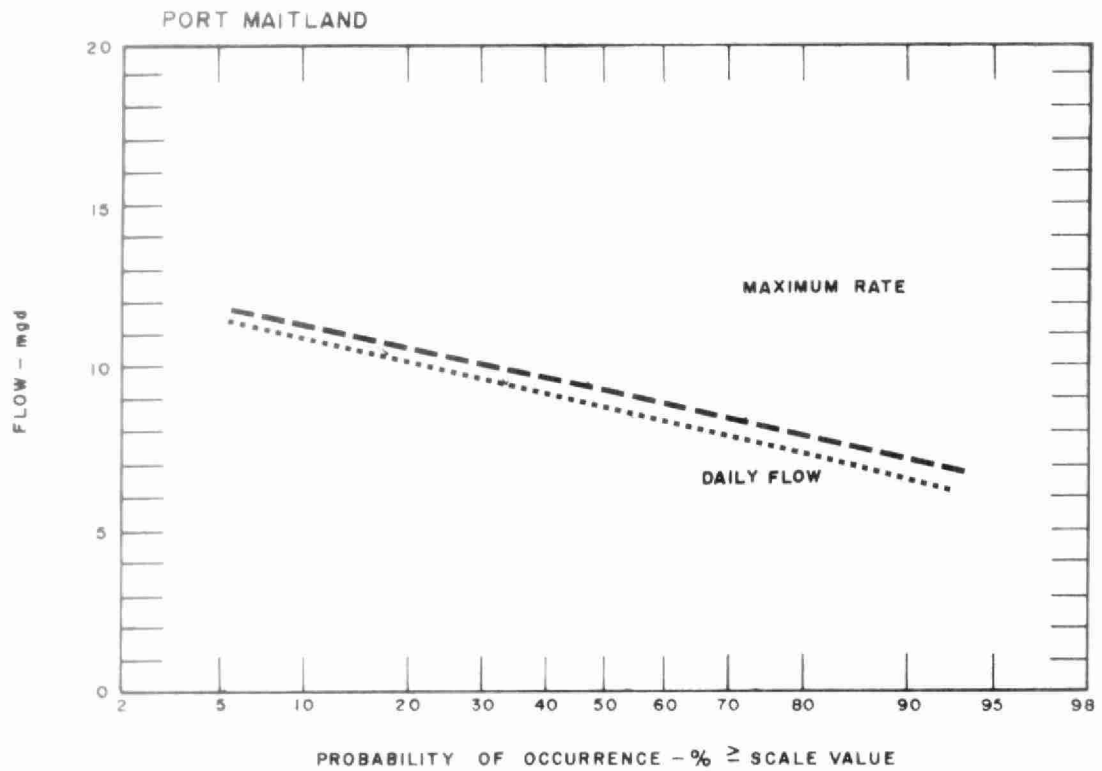


FLOWS

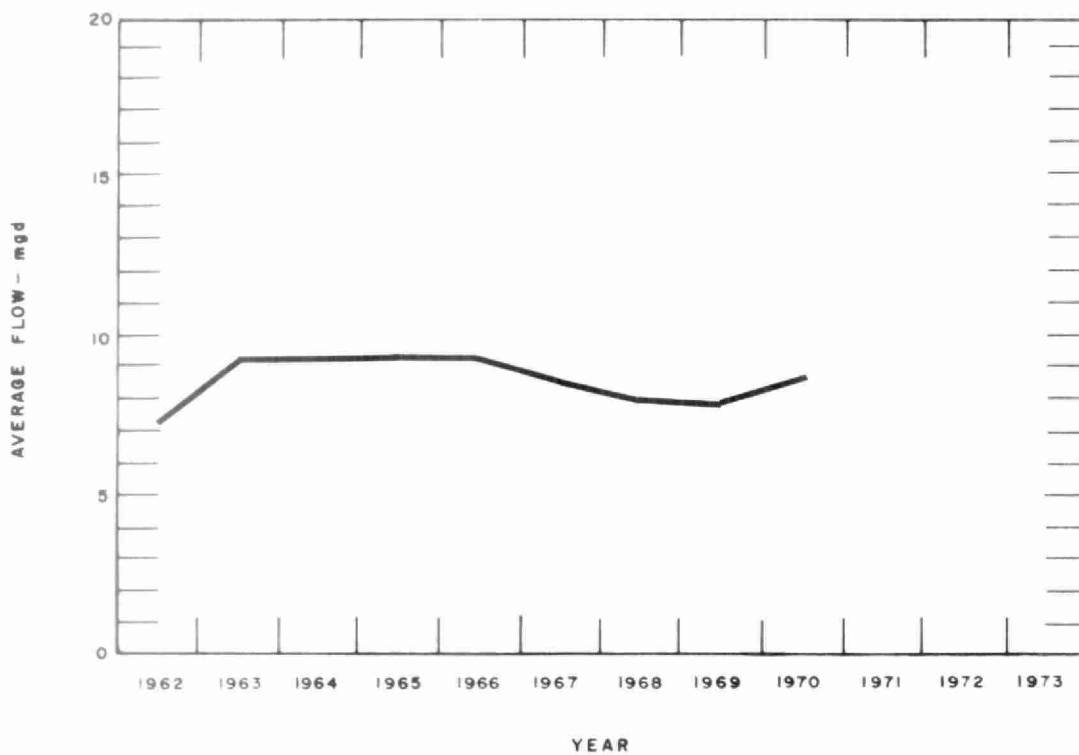


PLANT FLOWS

MONTH	TOTAL PLANT OUTPUT mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM RATE mgd	MAXIMUM DAILY FLOW mil gal	MAXIMUM 3-DAYS' FLOW mgd
JANUARY	258.1	8.33	12.2	10.0	9.3
FEBRUARY	241.0	8.61	11.5	9.8	9.3
MARCH	275.7	8.88	11.5	10.4	10.0
APRIL	282.5	9.41	12.1	11.3	10.7
MAY	318.9	10.29	14.1	12.0	11.2
JUNE	306.2	10.22	13.5	12.4	12.3
JULY	327.8	10.56	13.5	12.7	12.3
AUGUST	383.8	12.37	14.8	14.4	14.0
SEPTEMBER	271.2	9.04	14.1	13.4	13.1
OCTOBER	322.1	10.39	13.8	12.6	11.5
NOVEMBER	310.4	10.35	14.4	13.5	12.2
DECEMBER	271.1	8.75	13.0	11.2	10.8
TOTAL	3568.8				
AVERAGE		9.83	(MAXIMUM VALUES FOR THE YEAR)		
			14.8	14.4	14.0



FLAWS

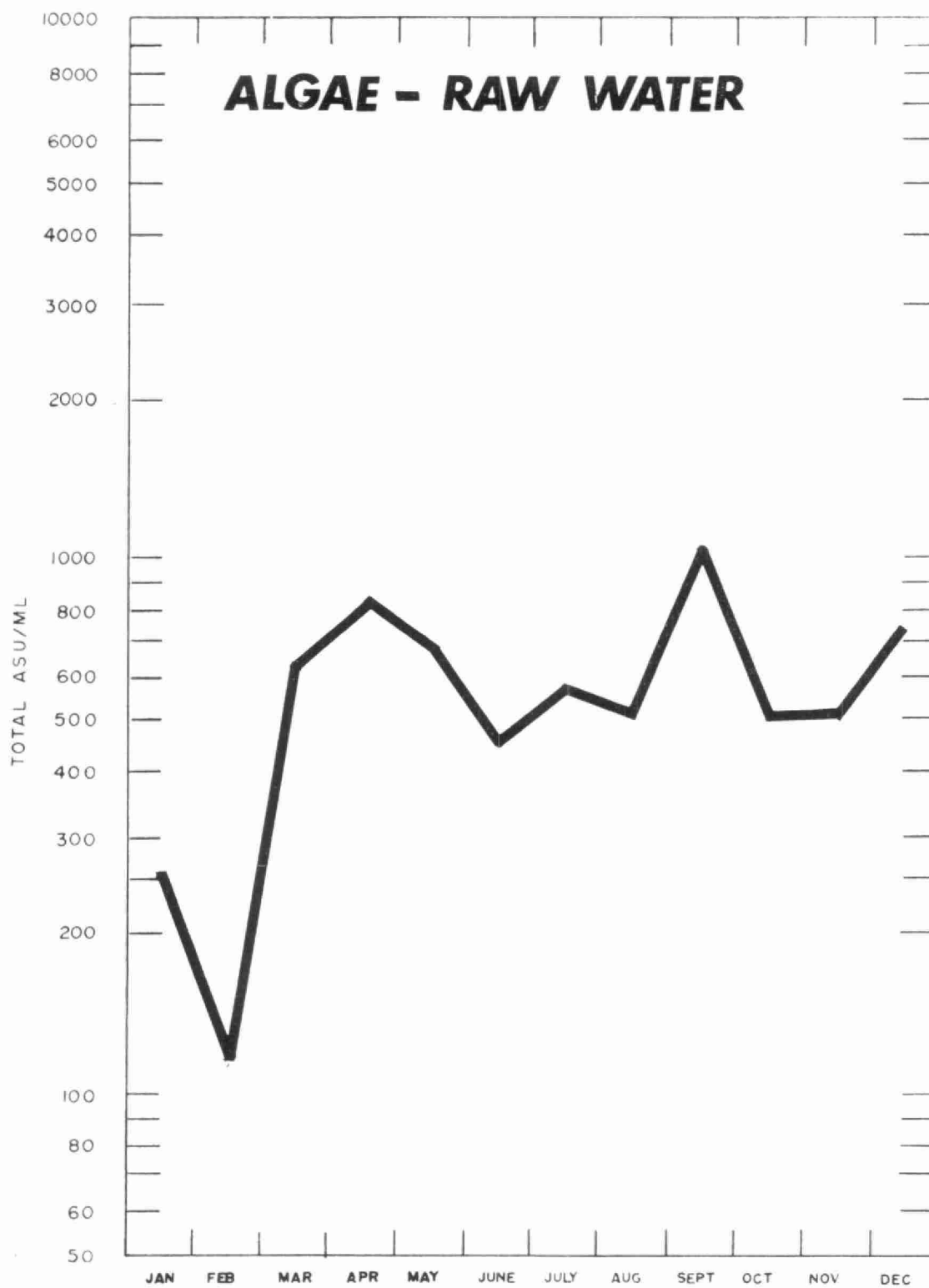


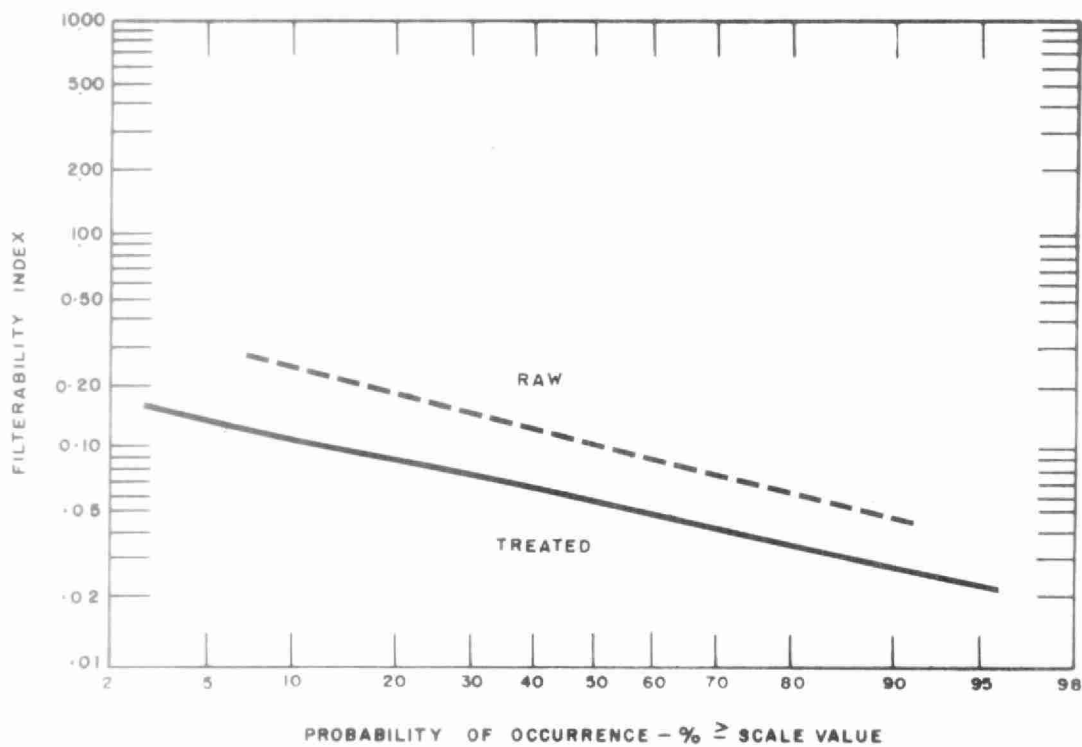
FLOWS

MONTH	TOTAL FLOWS in millions of gallons			
	PORT MAITLAND	SHERBROOKE	ERCO	DUNNVILLE
JANUARY	225.76	134.84	90.92	32.29
FEBRUARY	211.53	143.42	68.11	29.47
MARCH	246.00	167.65	78.35	29.73
APRIL	251.04	140.69	110.35	31.43
MAY	284.61	173.03	111.58	34.31
JUNE	263.57	184.10	79.48	42.63
JULY	285.01	178.61	106.40	42.81
AUGUST	339.38	218.43	120.95	44.46
SEPTEMBER	242.46	141.70	100.77	28.73
OCTOBER	303.33	192.24	111.10	18.77
NOVEMBER	289.21	180.11	109.10	21.15
DECEMBER	251.43	157.13	94.30	19.70
TOTAL	3193.33	2011.95	1181.41	375.48
MONTHLY AVERAGE	266.11	167.66	98.45	31.29

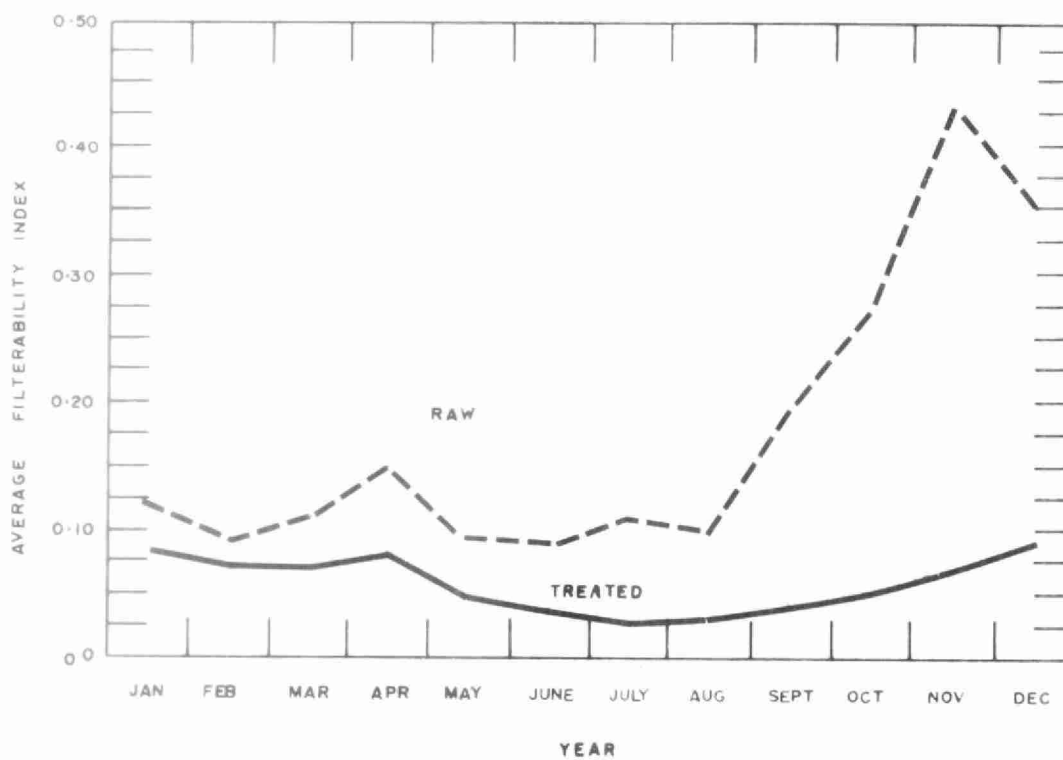
CHLORINATION and DISINFECTION

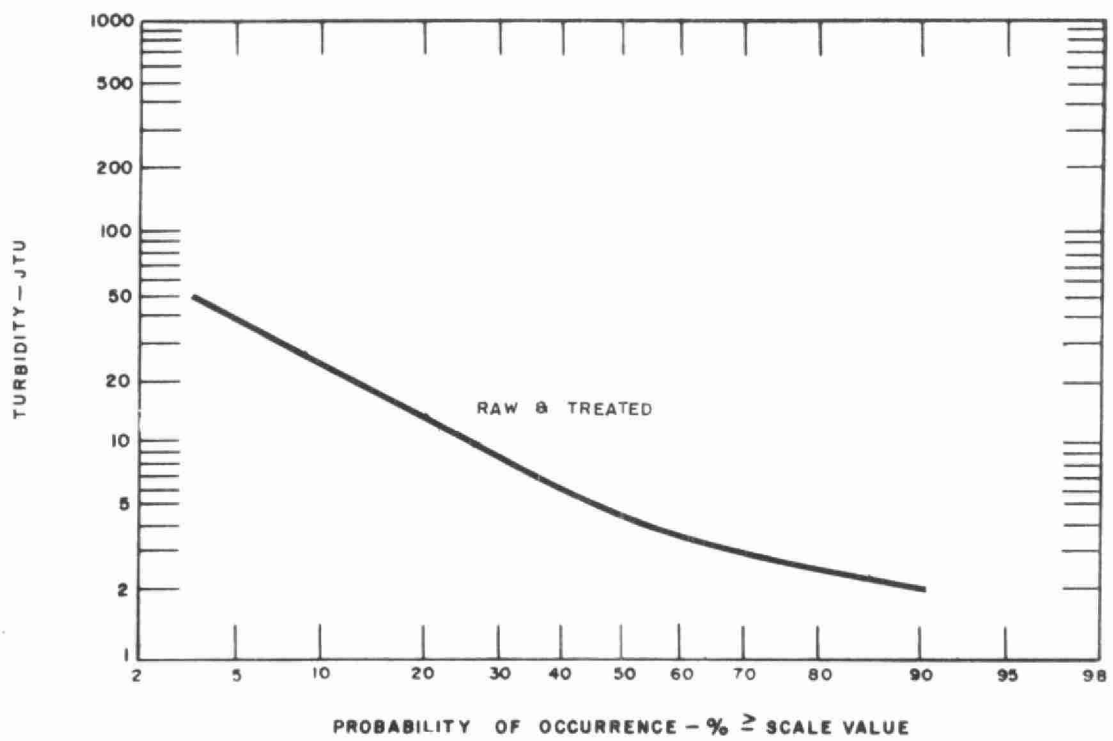
MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES WITH COLIFORMS PER 100 ml OF:					No. of Samples Taken	No. with Coliform Organisms	No. of Samples Taken	No. with Coliform Organisms	CHLORINE USED 10 ³ lb	DOSAGE		RESIDUAL in Plt. Eff. mg/l
	0	1 - 4	4 - 32	32-320	> 320						pre- mg/l	post mg/l	
JAN	1	2	-	1	-	4	-	8	-	2.4	-	.9	.5
FEB	-	2	1	1	-	4	-	8	-	2.0	-	.8	.5
MAR	-	-	2	3	-	6	-	9	-	2.4	-	.9	.5
APR	-	1	2	1	-	5	-	7	-	2.8	-	1.0	.5
MAY	-	1	-	2	1	4	-	8	-	3.2	-	.9	.5
JUNE	-	-	-	-	3	3	-	6	-	3.1	-	1.0	.5
JULY	-	-	1	-	2	3	-	6	-	2.4	-	1.0	.5
AUG	1	1	-	-	3	5	-	10	-	3.9	-	1.0	.5
SEPT	-	-	3	1	-	4	-	8	-	2.8	-	1.0	.5
OCT	-	-	1	1	2	4	-	8	-	3.5	-	1.1	.5
NOV	-	1	2	-	2	5	-	10	-	3.3	-	1.0	.5
DEC	3	-	-	1	-	4	-	8	-	3.0	-	1.1	.5
TOTAL						51	-	96	-	35.8			
AVERAGE	(NOTE: Geometric Mean) 31 COLIFORMS/100 ML									3.0	-	1.0	.5



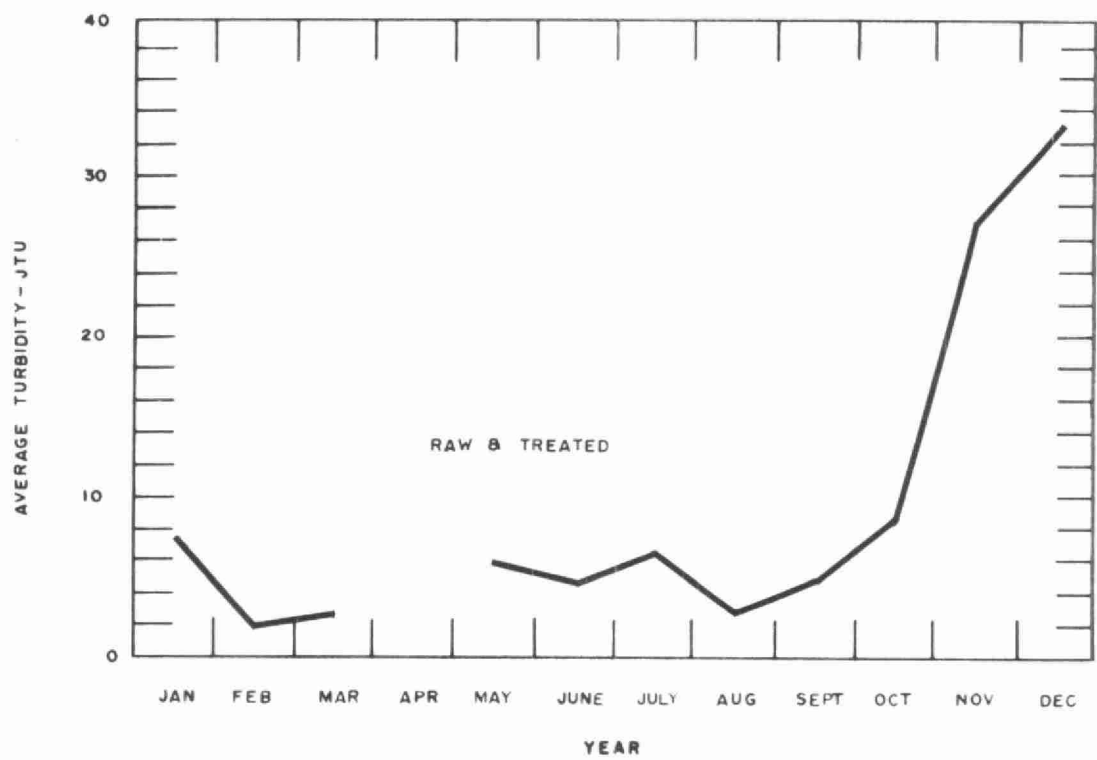


FILTERABILITY INDEX





TURBIDITY



PHYSICAL CHARACTERISTICS

MONTH	TURBIDITY		COLOUR		TEMPERATURE	
	Jackson Turbidity Units		Apparent Colour Units		Fahrenheit	Degrees
	RAW WATER	PLANT EFFLUENT	RAW WATER	PLANT EFFLUENT	AVERAGE	MAXIMUM
JANUARY	7.0	6.9	5	5	32	32
FEBRUARY	2.0	2.0	5	5	32	32
MARCH	2.6	2.6	5	-	32	33
APRIL	-	-	-	-	39	44
MAY	6.0	5.9	-	5	46	48
JUNE	4.6	4.2	5	-	54	57
JULY	6.7	6.7	5	5	64	67
AUGUST	3.2	3.2	5	5	69	71
SEPTEMBER	5.2	5.1	5	-	68	70
OCTOBER	9.3	8.9	8	10	59	82
NOVEMBER	27.8	27.0	5	5	49	56
DECEMBER	33.9	33.8	20	-	36	42
AVERAGE	9.8	9.7	5	5	48	
MAXIMUM	33.9	33.8	20	10		82

CHEMICAL CHARACTERISTICS

PROPERTY	RAW WATER				PLANT EFFLUENT				DESIRABLE STANDARDS
	Number of Samples	Average	Maximum	Minimum	Number of Samples	Average	Maximum	Minimum	
HARDNESS mg/l as CaCO_3	13	140	154	128	8	136	142	132	80 - 100
ALKALINITY mg/l as CaCO_3	13	102	109	97	8	101	105	97	30 - 100
IRON mg/l Fe	13	.30	1.50	.05	8	.17	.40	.05	< 0.3
CHLORIDE mg/l Cl^-	13	27	30	26	8	27	28	26	< 250

LABORATORY LIBRARY



96936000118570

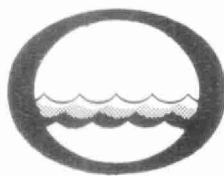
Date Due

TD/227/D86/D86/1970/MOE
Ontario Water Resources Co
Dunnville (regional)
water treatment plant: asnf
1970 operating c.1 a aa
summary



Environment Ontario

Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada



Water management in Ontario